THOUGHTFUL ELDERLY MONITORING IN A SMART HOME ENVIRONMENT

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. patent application Ser. No. 15/788,354, filed Oct. 19, 2017, the full disclosure of which is incorporated herein by reference.

BACKGROUND

Frequently, adult children live a significant distance from their parents. As the parents age, keeping track of a parent's well-being is often a task that falls to adult children, especially if the parent lives alone. Conventionally, this task is accomplished by frequent telephone calls and emails. Such an arrangement can tend to lead to check-ins with the parent only when convenient to the adult child, check-ins occurring at random times, and/or significant time gaps occurring between check-ins due to when the adult child remembers to check in. Further, such an arrangement may not allow the adult child to truly understand if the parent is in need of help. For instance, the parent may be well enough to conduct a phone call, but his or her behavior off the phone may be erratic, possibly indicative of a physical or mental condition.

SUMMARY

Various embodiments are described related to a method for monitoring a resident. In some embodiments, a method for monitoring a resident is described. The method may include performing a confidence assessment based on a plurality of smart home devices being present within a residence linked with a user account. The resident may reside at the residence. The method may include determining whether the residence is eligible for monitoring of the resident based on the confidence assessment. The method may include performing a learning process over a period of time during which resident activity data is collected from the plurality of smart home devices and analyzed to create an ordinary behavior model. The method may include following determining that the residence is eligible for monitoring of the resident and the learning process being performed, providing a notification that monitoring is active. The method may include monitoring data received from the plurality of smart home devices to identify data indicative of behavior considered unusual based on the ordinary behavior model. The method may include creating an alert that identifies the behavior and identifies how the behavior contrasts with the ordinary behavior model. The method may include sending, to an administrator device linked with the user account, the alert that identifies the behavior and identifies how the behavior contrasts with the ordinary behavior model.

Embodiments of such a method may include one or more of the following features: The method may include performing the confidence assessment. Performing the confidence assessment may include identifying a number of the plurality of smart home devices that are eligible to participate in the monitoring. Performing the confidence assessment may include identifying a second number of the plurality of smart home devices that are eligible to participate in the monitoring and are power-constrained devices. The method may include, in response to the monitoring being activated, activating a process at each exclusively battery-powered smart home device of the plurality of smart home devices that defines one or more rules indicative of when data indicative of a behavior of the resident should be stored for periodic scheduled transmission to a monitoring server system or the data indicative of the behavior of the resident should be transmitted immediately to the monitoring server system. Performing the confidence assessment may include providing a questionnaire to the administrator device linked with the user account. The questionnaire may require that a user of the administrator device identify a specific location of each smart home device of the plurality of smart home devices within the residence. The questionnaire may require that a user of the administrator device identify a plurality of types of worrisome scenarios of which the user of the administrator device desires to be notified. Performing the confidence assessment may include providing the questionnaire to the administrator device linked with the user account. The questionnaire may require that a user of the administrator device provide an indication of a number of residents that live in the residence. The questionnaire may require that a user of the administrator device provide an indication that no cats or dogs live with the resident. Performing the confidence assessment may include calculating a confidence metric based on the number of the plurality of smart home devices that are eligible to participate in the monitoring. Performing the confidence assessment may include calculating a confidence metric based on the second number of the plurality of smart home devices that are eligible to participate in the monitoring and are power-constrained. Performing the confidence assessment may include calculating a confidence metric based on the responses to the questionnaire received from the administrator device. Performing the confidence assessment may include calculating a confidence metric based on comparing the calculated confidence metric to a confidence metric threshold. The plurality of smart home devices may be selected from the group consisting of: a smart home smoke detector; a smart home carbon monoxide detector; a smart indoor security camera; a smart outdoor security camera; a smart thermostat; a smart home assistant device; a smart security system; a smart window/door sensor; a smartphone; and a smart doorbell device. The plurality of smart home devices may include either a video camera, microphone, or a motion sensor. The method may include outputting, via a smart home device of the plurality of smart home devices, the alert.

In some embodiments, the method may include monitoring the resident using the plurality of smart home devices over a trial period of time to generate a body of trial monitoring data, the trial period of time being sufficient to encompass at least a plurality of daily- and/or day-of-week-specific activity routines of the resident. The method may include processing the trial monitoring data to determine whether the plurality of smart home devices are sufficient in type, number, and location to sufficiently track the resident through their daily- and/or day-of-week-specific activity routines according to a predetermined threshold criterion. The method may include determining that the plurality of smart home devices are not sufficient in at least one of type, number, and location to sufficiently track the resident according to the predetermined threshold criterion, and, responsive to said determining, sending to the administrator device a notification that the residence is not eligible for said monitoring of the resident. The predetermined threshold criterion may include that, for at least a threshold percentage of each day of the trial period, a location of the resident within the residence is identifiable solely using the trial monitoring data. The threshold percentage may be at least 95